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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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08/932,228 09/17/97 SCHUEGRAF

K MICRON.009DV

MM91/0605

KNOBBE MARTENS OLSON AND BEAR
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SIXTEENTH FLOOR
NEWPORT BEACH CA 92660-8016

EXAMINER

VLI, H

ART UNIT

PAPER NUMBER

2811

DATE MAILED:

06/05/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.

08/932,228

Applicant(s)

SCHUEGRAF ET AL.

Examiner

HUNG VU

Art Unit

2811



-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on Mar 19, 2001
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 11-16 and 21-24 is/are pending in the application.
- 4a) Of the above, claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 11-16 and 21-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

a) ☐ All b) ☐ Some* c) ☐ None of:

- ☐ Certified copies of the priority documents have been received.
- ☐ Certified copies of the priority documents have been received in Application No. _____.
- ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

*See the attached detailed Office action for a list of the certified copies not received.

- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

- 15) ☐ Notice of References Cited (PTO-892) 18) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 19) ☐ Notice of Informal Patent Application (PTO-152)
- 17) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s). _____ 20) ☐ Other:

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DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claims 21, 22, and 24 are rejected under 35 U.S.C. 102(a) as being anticipated by Anjum et al. (PN 5,372,951, of record).

Anjum et al. discloses an integrated circuit having a plurality of isolation regions within a semiconductor substrate, each isolation region defined by;

a trench within the substrate;

a halide-doped silicon oxide (36,38) filling the trench to form an isolation element;

wherein the halide-doped silicon oxide has a dielectric constant of less than 3.9;

wherein the halide-doped silicon oxide comprises fluoride-doped silicon dioxide. Note

Figure 5 of Anjum et al..

It is noted that in the claim 21, the terms “the trench having a characteristic profile produced by an etch process” and “the substrate retaining the characteristic profile of the trench” are method recitations in a device claimed, and they are non-limiting, because only the final product is

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relevant, not the method of making. A product by process claim is directed to the product per se, no matter how actually made. See also MPEP 2113. Moreover, an old or obvious product produced by a new method is not a patentable product, whether claimed in "product by process" claims or not.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 11-16 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bose (PN 5,492,858, of record) in view of Anjum et al. (PN 5,372,951, of record).

Bose et al. discloses an isolation structure in a semiconductor substrate comprising,

a recessed portion (20,21,22) formed with a vertical sidewall within the semiconductor substrate (10);

a dielectric material (14) filling the recessed portion;

wherein the recessed portion comprises a trench structure having a ratio of height to width of less than 2:1;

a barrier layer (13,18) disposed between the recessed portion of the semiconductor substrate and the dielectric material. Note Figures 1-5 of Bose et al..

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Bose et al. discloses the dielectric material comprising silicon oxide. Bose et al. does not disclose the silicon oxide comprising a halide-doped. However, Anjum et al. discloses an isolation structure (36,38) having silicon oxide comprised halide-doped. Note Figure 5 of Anjum et al.. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the recessed portion of Bose et al.'s having the silicon oxide comprising halide-doped, such as taught by Anjum et al. in order to dislodge oxygen at silicon-oxygen bond sites and to enhance thickening effect of oxide regions.

With regard to claim 13, Bose et al. and Anjum et al. disclose all of the claimed limitations except the trench having a depth of less than 200 nm. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the trench of Bose et al.'s and Anjum et al.'s having a depth of less than 200 nm because such structure is well-known in the art in order to decrease the void formation and to increase the surface planarity of the final trench structure. Note Swan et al. (PN 5,356,838) of record is cited to support the well-known position.

Response to Arguments

3. Applicant's arguments filed 09/29/00 have been fully considered but they are not persuasive.

It is argued, at page 2 of the Remarks, that a characteristic profile produced by an etch process is not a process limitation but it is a structure limitation. This argument is not convincing because

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the term “the trench having a characteristic profile produced by an etch process” is method recitation in a device claimed, and it is non-limiting, because only the final product is relevant, not the method of making. A product by process claim is directed to the product per se, no matter how actually made. See also MPEP 2113. Moreover, an old or obvious product produced by a new method is not a patentable product, whether claimed in “product by process” claims or not. Note that a trench can be formed first, then the halide-doped silicon oxide can be form later by different processes (thermally grown, CVD, PVD) to form the LOCOS. Therefore, Applicants’ claim 21 does not distinguish over the Anjum et al. reference.

It is argued, at pages 3 and 4 of the Remarks, that there would not have been motivated to employ the trench structure of Bose et al. with the thermally-grown, fluorine-doped oxide of Anjum et al., as they involve two completely different processing techniques and resulting structures. This argument is not convincing because Bose et al. teaches to form the trench, and Anjum et al. teaches to form the halide-doped silicon oxide. Since the halide-doped silicon oxide can be form by different processes (thermally grown, CVD, PVD, etc.), therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the trench of Bose et al.’s having the silicon oxide comprising halide-doped in order to dislodge oxygen at silicon-oxygen bond sites and to enhance thickening effect of oxide regions.

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Conclusion

4. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Papers related to this application may be submitted to Technology Center (TC) 2800 by facsimile transmission. Papers should be faxed to TC 2800 via the TC 2800 Fax center located in Crystal Plaza 4, room 4-C23. The faxing of such papers must conform with the notice published in the Official Gazette, 1096 OG 30 (November 15, 1989). The Group 2811 Fax Center number is (703) 308-7722 and 308-7724. The Group 2811 Fax Center is to be used only for papers related to Group 2811 applications.

Any inquiry concerning this communication or any earlier communication from the Examiner should be directed to **Hung Vu** whose telephone number is **(703) 308-4079**. The

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Examiner is in the Office generally between the hours of 7:00 AM to 5:30 PM (Eastern Standard Time) Monday through Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, **Tom Thomas**, can be reached on (703) 308-2772.

Any inquiry of a general nature or relating to the status of this application should be directed to the **Technology Center Receptionists** whose telephone number is (703) 308-0956.

Vu

June 4, 2001

Steven Loke
Primary Examiner

A handwritten signature in cursive script that reads "Steven Loke".